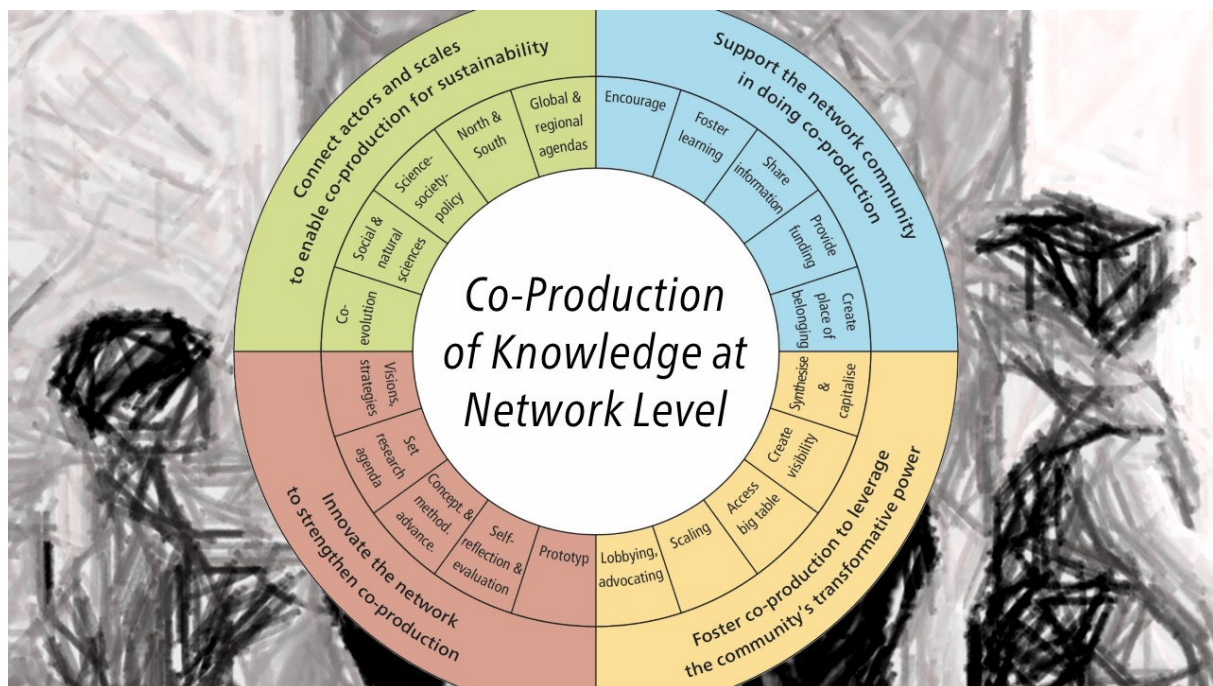


Finding ways to sustainability through the 'network compass'

Flurina Schneider, Theresa Tribaldos

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1 Introduction

In view of numerous and far reaching sustainability challenges such as climate change, biodiversity loss, social inequalities (to name but a few), effective collaboration between science and society is not only desirable; it is imperative. Networks play an important role in this regard because they link researchers and other actors from civil society, government, and businesses across different scales. The youth-led climate strikes, which united people in unprecedented numbers in cities across the globe in 2019, were networks in themselves – between young people and representatives of NGOs, governments, and universities – connecting the results of science and climate change negotiations at the global level to actions at the local level. Similarly, research networks focusing on the study of climate change connect researchers with intergovernmental assessment processes such as the Intergovernmental Panel on Climate Change, or IPCC.

However, facilitating such ‘knowledge-action’ networks that contribute effectively to sustainability outcomes is a challenge in itself. The method presented here offers guidance in the form of a compass – a ‘network compass’ – that supports networks in reflecting about promising and effective strategies for sustainability transformations.

1.1 What are sustainability-oriented knowledge-action networks?

Sustainability-oriented knowledge-action networks are entities linking various actors from science, policy, and society, across geographical scales, to promote collaboration and co-production of knowledge aimed at strengthening joint contributions to sustainable futures. These networks are usually organized around a support entity such as a secretariat and/or steering committee to help network members achieve their joint mission. But missions, governance philosophies, and related activities can differ between networks. Also, networks can weight knowledge and action differently: While some have a strong research focus, others rather seek to bring knowledge to action.

Despite their diverse structures however, networks have particular functionalities and capacities, and strengths and weaknesses, which differ from those of individual organizations or projects. For example, networks are particularly useful for flexibly connecting various actors or joining forces.

1.2 Why focus on co-production of knowledge and action?

Co-production of knowledge and action is a novel type of science–society interaction, where various actors engage in iterative and collaborative processes to jointly produce context-specific knowledge and pathways to sustainable futures. It is an alternative model to more classical forms of science–society interaction, where science is assumed to generate new knowledge and society to adopt it. The idea of co-producing knowledge and action is gaining traction, as evidence increases that sustainability problems are too complex, too contested, and too uncertain for individual scientific disciplines to generate solutions alone. It is only through combining diverse types of expertise and knowledge from both the social and natural sciences as well as from practice, that sustainability problems might be transformed.

2 Key elements of the 'network compass' method

The network compass method aims to foster self-reflection and learning within and between networks in the process of (re)developing action strategies to drive a sustainability agenda. It can be applied for the following purposes:

- Developing action strategies when creating a new network
- Assessing and redeveloping action strategies of existing networks
- Fostering joint understanding and trust within networks
- Identifying collaboration opportunities between networks

The method combines the network compass tool with theory of change thinking. Acknowledging that knowledge-action networks are very heterogeneous and that multiple pathways to impact exist, it posits that networks must develop network-specific theories of change that specify how various activities are best combined to achieve the envisaged sustainability goals. The network compass tool aids this process by enabling systematic reflection on the specific potentials and challenges related to the functionality of a network.

The network compass method was developed by a team of researchers from the Centre for Development and Environment (CDE) at the University of Bern, through a reflection and learning process undertaken in cooperation with a range of global research projects and partner networks of Future Earth.

2.1 Theory of change thinking

Theory of change thinking aims to enhance learning to maximize the effectiveness of societal interventions, through designing and regularly scrutinizing pathways to impact. A theory of change outlines an intervention's working hypothesis about how its activities might trigger envisaged changes, and continuously refines it through cycles of action and reflection (Schneider et al. 2019). In other words, it articulates the relations between sustainability goals, diagnosed causes of unsustainability, knowledge gaps, context conditions, activities, pathways to impact, and underlying assumptions about how change happens and the role of knowledge in this process. Extensive guidelines for the development of theories of change by individual organizations or projects can be found in Taplin and Rasic (2012). Additionally, a board game (the 'Theory of Change Game') supports creation of theories of change in a collaborative and playful way. The game in particular serves to create joint understandings of an initiative's goals, approaches, and contexts, and to familiarize its players with different worldviews, assumptions, and preferences (Tribaldos and Schneider, 2021).

2.2 The network compass

The network compass supports knowledge-action networks in designing promising theories of change by emphasising a network's particular functionalities and how these can be engaged for co-production processes. It outlines four basic fields of action through which a network can successfully achieve its mission. Each field of action is further divided into 5 subfields (see Figures 1 and 2) that exemplify different activity lines (these subfields are not exhaustive and can be complemented as needed).

Action field 1: Connecting actors and scales to enable co-production. The first field of action highlights the capacity of a network to convene actors across disciplines, sectors of society, and

geographic regions and scales, and to build a community that engages in the co-production of knowledge and action. The network coordination entity takes on the role of a broker: it organizes interested actors and creates favourable conditions for co-production among the network members.

Activities to convene diverse actors can include organizing face-to-face meetings (e.g. conferences, working groups) and online gatherings (e.g. webinars, interactive platforms), and establishing science–policy interfaces (e.g. via boundary organizations) and member/expert databases. In all cases, the activities should enable inclusive participation (e.g. through selection of committee members, and targeted funding to less well-resourced participants).

Action field 2: Supporting the network community in co-production. The second field of action emphasizes the capacity of a network to enhance the agency of its members. In this case, the network coordination entity acts as a service body to its members, helping members to implement co-production in their contexts more effectively.

Activities to support the network community can involve basic encouragement, organization of learning opportunities such as webinars, massive open online courses, practical training courses, coaching workshops, or working groups to foster co-production competences. The provision of funding and the creation of a home' and place of belonging are other important services.

Action field 3: Fostering co-production to leverage the network community's transformative power. The third field of action points to a network's capacity to funnel the members' efforts and to become stronger as a group. United in a network, members have more influence than as individuals, as the network can speak on behalf of the whole community.

Activities to leverage the network community's efforts can include synthesis of, and capitalization on, multiple research findings and experiences. This involves generating visibility via communication of findings through co-produced websites, magazines, and policy briefs; participation in policy events; and use of common weight to access 'big tables' (e.g. events with powerful economic actors). It also involves conducting advocacy and lobbying for a community's interests (e.g. with science funders, UN organizations, or national governments).

Action field 4: Innovating the network to strengthen co-production. The fourth field of action relates to the need to foster innovation within the network itself, in order to strengthen its capacity to perform co-production in all three other fields of action. The network coordination entity acts as an entrepreneur aiming to shape and transform the network itself.

Activities to foster innovations include the development of novel visions, strategies, and research agendas; conceptual and methodological advancement; prototyping; and self-reflection and evaluation.

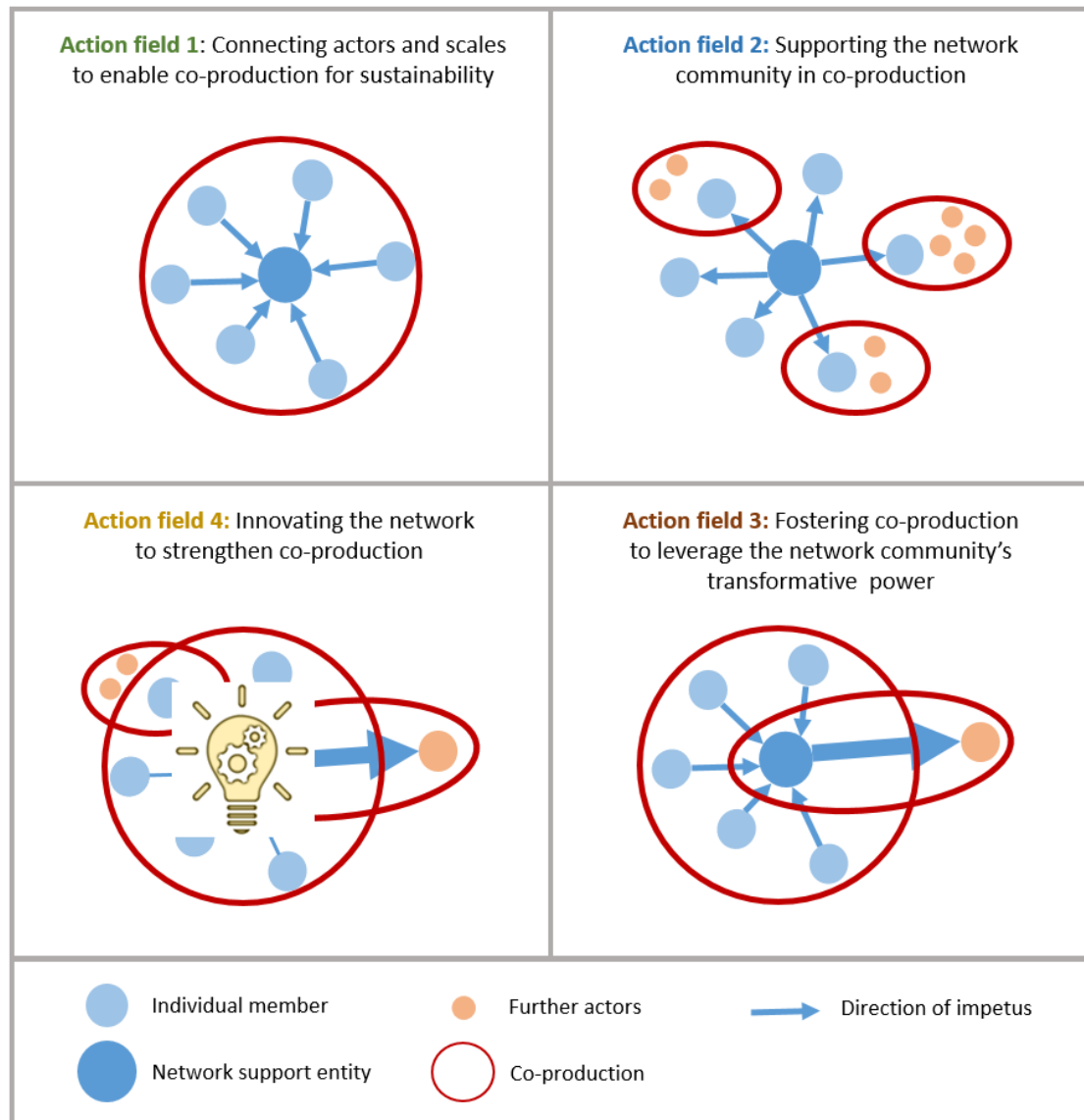


Figure 1: Conceptual definition of the four fields of action and the respective locations of co-production (Schneider et al. 2021)

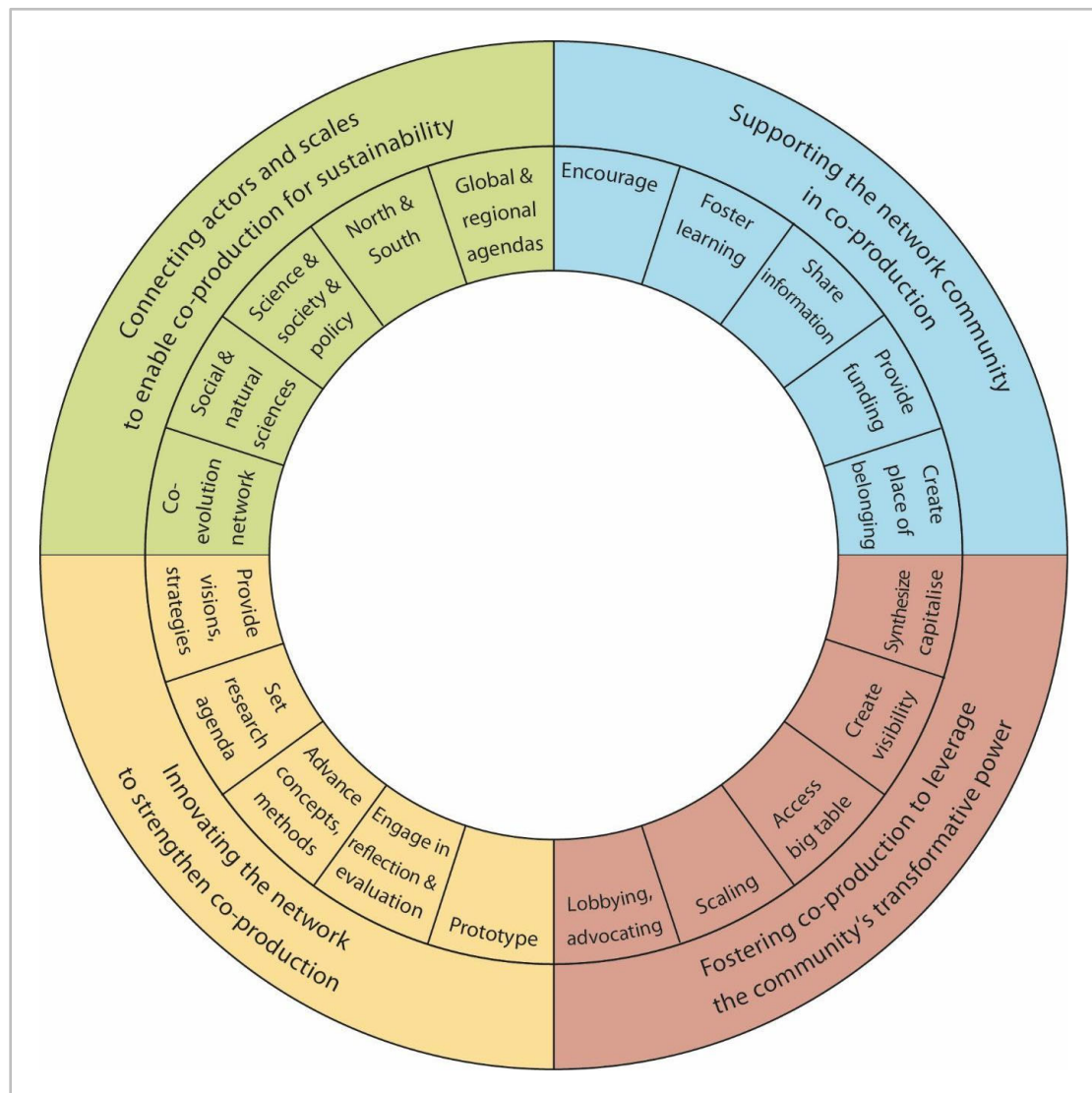


Figure 2 Figure 2: 'The network compass': four generic fields of action, each with five subfields, through which networks seek to foster co-production of knowledge for sustainability transformations (Schneider et al. 2021).

3 Applying the network compass method for (re)developing a network's action strategy

3.1 Who is involved?

Representatives of the network coordination entity and steering committee. Depending on the situation, it can be advisable to include further network members and key partners to acknowledge a broad range of perspectives and expertise. Broad inclusion of network members is also key when aiming to generate mutual understanding and trust within the network community.

3.2 Preparation tasks by the facilitator

- 1) **Carefully read the network compass description and guidelines.** A good understanding of the guiding framework was shown to be helpful for moderating the discussion. Further explanation of the framework is provided by a video (<https://www.youtube.com/watch?v=ju36XNugl8I>) or, in more detail, by Schneider et al. 2021.
- 2) **Prepare a template (digital or on paper) of the network compass** that is large enough to work with as a group. For example, you can use Figure 2 as a PowerPoint slide or draw the compass on a large sheet of paper.
- 3) **Arrange the setting.** If you plan to conduct a physical meeting, prepare moderation material such as pinboards, flip charts, post-its, and coloured dots. If the meeting is online, familiarize yourself with participation options of the software used (e.g. how participants can write on the network compass template).

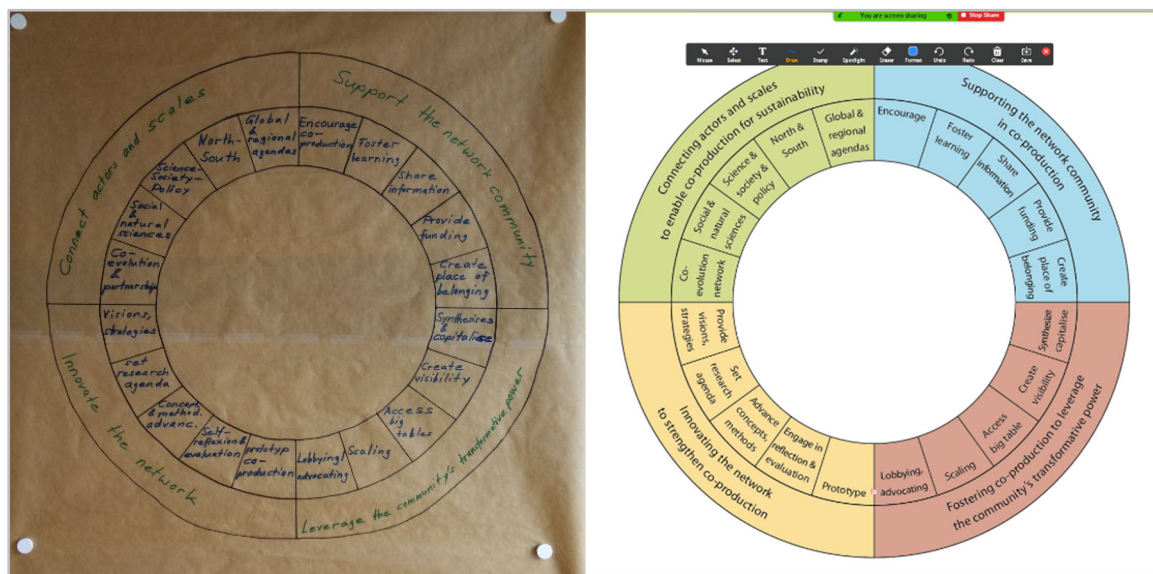


Figure 3 Examples of working templates for reflecting on a network's action strategy (analogue/digital).

3.3 Steps and guiding questions

In the following, we present generic steps and questions to guide your reflections. They can be adapted according to the goals you wish to achieve and to the resources available (see also examples in section 4).

The steps are iterative in nature and the process usually requires several rounds of reflection. For example, after scrutinizing your assumptions in Step 3 (Figure 4), you might need to adapt the network purpose or activities identified in Steps 1 and 2.

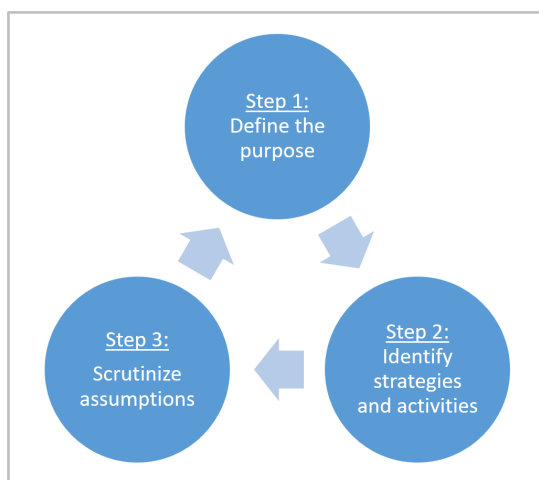


Figure 4 Generic steps of the network compass method

Before starting the exercise, introduce the network compass method, namely the four fields of action and their rationale. Figure 1 can be helpful for this purpose. Alternatively, you can show the video.

Step 1: Define the purpose of your network

What is the main mission/overall purpose of your network regarding sustainability?

Define what sustainability problem you would like to address with your network and what societal impact you wish to achieve (how will the original problem have changed, and what is the contribution of your network towards this change?). Be as precise as possible and write keywords on a flip chart/slide.

Box 1: Example LIRA 2030 Africa¹. Purpose of the network

LIRA 2030 Africa aims to foster scientific contributions from Africa to the implementation of the 2030 Agenda for Sustainable Development, especially in the urban context. More specifically, it aims to build the capacity of next-generation scientists for transdisciplinary research required for addressing complex regional sustainability challenges in Africa.

¹ <https://council.science/what-we-do/funding-programmes/lira2030/>

Step 2: Identify strategies and activities

What strategies and activities will your network employ to achieve its mission?

Use the network compass to systematically reflect on the importance of the different fields of action. It can be fruitful to focus first on existing activities (e.g. what has been done in recent years), and then on new priorities for the future. To this end, participants can write key activities – both existing and new – on post-its and pin them onto the network compass template. Activities can be prioritized using coloured dots.



Figure 5 Example of a group working with the network compass (Fotos: Franziska Orlor)

Not all fields of action need necessarily be addressed, but they can be if they serve the network's purpose. The combinations of activities that are meaningful for a particular network depend on the network's theory of change. In addition, specific activities can serve different fields of action, e.g. organization of a conference can aim to connect actors across scales (Action field 1) and create a place of belonging (Action field 2).

You might find it useful to use the following more specific questions for this step:
To achieve your mission, do you (aim to) ...

Action field 1: ... convene actors across disciplines, sectors of society, places, and scales, and to build a community that engages in co-production of knowledge and action? If yes, through what activities?

Action field 2: ... support your community (e.g. your members) to strengthen their agency for co-production of knowledge and action (e.g. through funding or information sharing)? If yes, through what activities?

Action field 3: ... leverage your community's efforts to become stronger as a group (e.g. through coordinating synthesis or lobbying)? If yes, through what activities?

Action field 4: ... innovate your network to strengthen its overall capacity to better contribute to sustainability (e.g. by proposing fundamentally new approaches)? If yes, through what activities?

Box 2: Example LIRA 2030 Africa. Strategies and activities

To achieve their aim, LIRA 2030 Africa focuses mainly on activities related to action field 2 (supporting the network community): It provides collaborative research grants to African early career scientists to undertake integrated transdisciplinary research on global sustainability, and it fosters capacity building to ensure that the early career scientists have the necessary skills and knowledge to develop and undertake such research in their contexts. These activities are complemented by actions in the other three fields of action. Regarding action field 1 (connecting actors and scales), LIRA 2030 Africa invests in building a network of African transdisciplinary sustainability scientists to enhance South–South collaboration and to foster participation of African voices in global sustainability debates. LIRA 2030 Africa further works towards leveraging the efforts of their members (action field 3) by creating visibility for their insights (e.g. through videos and a blog series), nominating African scientists for international scientific committees and conferences, working groups, and inter-governmental policy processes (e.g. Agenda 2030, the Sendai Framework on Disaster Risk Reduction, IPCC and others), and by holding strategic meetings with powerful institutions and funding agencies aiming to enhance the context conditions for transdisciplinary research in Africa. Last but not least, LIRA 2030 Africa engages the whole network community in self-reflection and learning (e.g. through regular workshops and a specific learning study) to identify spaces for innovations to constantly improve the network performance.

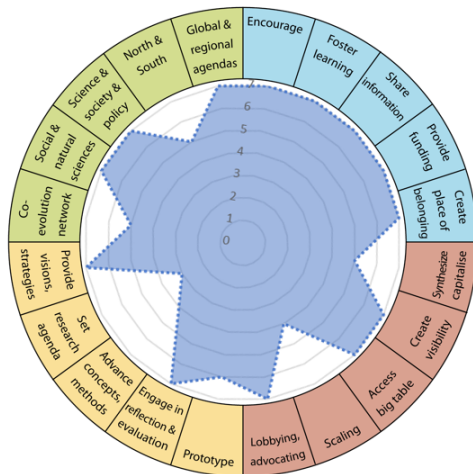


Figure 6 LIRA 2030 Africa's strategic emphasis on the fields of action of the network compass (1= no emphasis; 7= high emphasis) (Schneider et al. 2021).

Step 3: Scrutinize assumptions on pathways to impact

How are your planned activities likely to contribute to your envisaged sustainability goals?

Scrutinize underlying assumptions on hypothesized pathways to impact. You can do so by asking questions related to problem diagnoses, knowledge gaps, and context conditions. Ask how change happens and what the role of knowledge in this process might be. Reflect on what the answers mean for your network purpose and activities.

- What is causing the sustainability problem you wish to tackle?
- Is there evidence that your planned activities might lead to the envisioned changes (e.g. from research insights or past experience)?
- What are potential barriers and how do you tap windows of opportunity?
- What resources and skills are needed, and do you have these?
- How do different socio-political contexts affect the impact of your work?

- How do you believe knowledge can make an impact (e.g. through publications, advice, training, social learning, competence building)?
- Is lacking knowledge really the (only) problem? What other aspects besides knowledge could be key (e.g. trust creation, emotions, power relations, misleading incentives)?
- What values guide you in your work?

Box 3: Example LIRA 2030 Africa. Assumptions regarding pathways to impact

The purpose and activities of LIRA 2030 are based on the following rationale: Science, technology, and innovation (STI) can help tackle sustainability challenges, but there is a considerable gap in many African countries between demand and supply of scientifically-based, country/region-specific knowledge. This gap involves financial resources and scientific capacities, as well as structures for effective collaboration between nations. Moreover, scientists in Africa rarely collaborate with one another but instead seek international partnerships.

Scientific and societal responses need to be integrated and coordinated to effectively contribute to sustainability transformations. This calls for research that is highly integrative and solution-oriented, reaches across disciplines (interdisciplinary), and engages with other knowledge partners (transdisciplinary). But the capacity to apply such novel skills, methodologies, approaches, and tools needs to be strengthened. Turning transdisciplinary research into a mainstream endeavour in African countries requires enhanced capacity to undertake this type of research. But while recent years have seen the emergence of alternative funding that prioritises integrated transdisciplinary research, traditional research funders do not yet support this type of research sufficiently, in particular in Africa.

4 Application examples

4.1 Global Alliance for Inter-and Transdisciplinarity (ITD Alliance)

The ITD Alliance aims at strengthening and promoting the global capacity and calibre of collaborative modes of research and practice. A network in the making, it is composed of various existing institutions and (sub)networks. Its executive secretary used the network compass method to systematically reflect on possible fields of action and related activities when drafting the network strategy. The method helped him to formulate a draft mission statement; to scrutinize the context conditions, including the landscape of existing institutions and networks; and to systematize existing/planned activities with a view to future strategy development.

4.2 Network for Transdisciplinary Research (td-net)

Td-net is a Swiss-based platform that supports community building by advancing mutual learning between inter- and transdisciplinary researchers and lecturers across thematic fields, languages, and countries. The td-net office applied the network compass method to assess its strategic orientation and redevelop its four-year strategic planning, together with its scientific advisory board, in an online setting (using Zoom software, popularized during the pandemic). After introducing the method through a slide presentation, the facilitator asked the participants to mark the five (sub)fields of action in which td-net is particularly strong. To do so, each participant used the stamp function and the results were briefly discussed.

Next, the group began to reflect on where they wanted to go in future. Before using the network compass tool again, several participants introduced key context developments such as community needs and ongoing policy and research processes. Following these inputs, each participant marked the network compass with arrows to the subfields of action they considered to be particularly important for the future. Based on this assessment, they then discussed necessary adjustments in their strategic orientation.

4.3 Future Earth

Future Earth is a global network of scientists, researchers, and innovators collaborating for a more sustainable planet. This global community is spread over a series of subnetworks, national and regional committees, and other entities. Future Earth applied the network compass method to foster trust and mutual understanding of the capacities, strengths, and diversity of approaches embedded in the different Future Earth entities to build constructive relationships across the community.

Ahead of a three-day virtual summit, all entities were asked to conduct a reflection activity in the form of an online survey (using SurveyMonkey), where they reflected about and documented a) their own purposes, activities, and assumptions, and b) their roles and expectations as part of the whole Future Earth network. To conduct the reflection activity, the participants received extensive guidelines introducing the method, including a table with sample activities for each subfield of action of the network compass. The data was evaluated and visualized by a team from the University of Bern (see Figure 7).

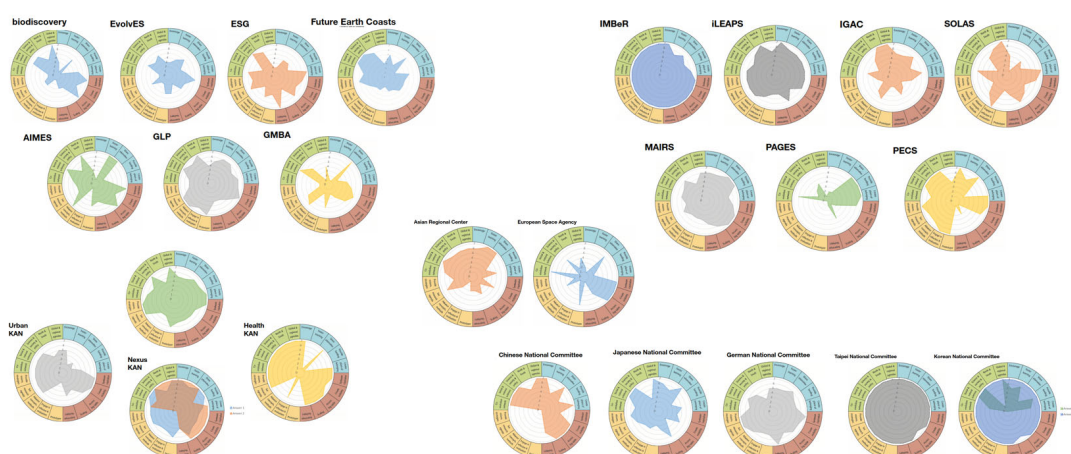


Figure 7 Visualisation of the Future Earth entities self-assessments (rating of their activity levels)

At the summit, the University of Bern researchers presented the results of the pre-summit reflection activity to stimulate discussion among the entities. The participants were then divided into break-out groups to discuss differences and similarities and to explore possible gaps and opportunities for collaboration. They used the following guiding questions: a) What are the main outcomes of the network compass exercise for us: where are we (and where are we not) on the compass? b) Given our collective similarities and individual specificities, what are the areas in which we should try to grow or improve? How might Future Earth's various entities support us in these areas? c) What would we bring to the table? How can we help Future Earth? A first round of break-out sessions took place in groups of similar entities, a second round in mixed groups. Results of these discussions were then reported back to the plenary. A post-summit evaluation survey showed that the large majority of participants found the activity useful for stimulating discussions and fostering mutual understanding.

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